भारतीय मानक
Indian Standard

IS 9122 : 2023

गैस सिलिंडर वाल्व की टाइप 2 टेपर चूड़ियों की जांच के लिए निरीक्षण गेज, 3 इन 25 टेपर — विशिष्टि

(दूसरा पुनरीक्षण)

Inspection Gauges for Checking Type 2 Taper Thread of Gas Cylinder Valves, Taper 3 in 25 — Specification

(Second Revision)

ICS 17.040.01:23.020.30

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June 2023 **Price Group 8**

Gas Cylinders Sectional Committee, MED 16

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on recommendation of the Gas Cylinders Sectional Committee has been approved by the Mechanical Engineering Divisional Council.

This Indian Standard was adopted by the Bureau of Indian Standards on recommendation of the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1979 and revised in 2008. While drafting 2008 version, technical assistance was taken from ISO 10920 : 1997 'Gas cylinders — 25E taper thread for connection of valves to gas cylinders — Specification', ISO 11116-1 : 1999 'Gas cylinders — 17E taper thread for connection of valves to gas cylinders — Part 1: Specifications', ISO 11116-2 : 1999 'Gas cylinders — 17E taper thread for connection of valves to gas cylinders — Part 2: Inspection gauges' and ISO 11191 : 1997 'Gas cylinders — 25E taper thread for connection of valves to gas cylinders — Inspection gauges'. ISO 10920 : 1997 and ISO 11116-1 : 1999 have been superseded by ISO 11363-1 : 2018 'Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders — Part 1: Specifications'. ISO 11116-2 : 1999 and ISO 11191 : 1997 have been superseded by ISO 11363-2 : 2017 'Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders — Part 2: Inspection gauges'.

Accordingly, committee decided to revise this standard and technical assistance has been derived from ISO 11363-1 : 2018 and ISO 11363-2 : 2017. In this revision following changes have been made:

a) Removal of single part gauges;
b) Addition of thread profile of valve stem and cylinder neck; and
c) Removal of Annex B.

The composition of the committee responsible for the formulation of this standard is listed in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSPECTION GAUGES FOR CHECKING TYPE 2 TAPER THREAD OF GAS CYLINDER VALVES, TAPER 3 IN 25 — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes dimensions, tolerances and material requirements of inspection gauges recommended for checking the taper thread on the valve stems and the threads in the cylinder necks of valve fitting conforming to Type 2 of IS 3224 and Type 2 of IS 8737. These threads are denoted as 17E and 25E. This standard also mentions the thread details of these 17E and 25E valve stems and cylinder necks.

2 REFERENCES

The Indian Standard listed in below contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
IS 1570 (Part 2) : 1979	Schedules for wrought steels: Part 2 Carbon steels (unalloyed steels) (*first revision*)
IS 3224 : 2021	Valve for compressed gas cylinders excluding liquefied petroleum gas (LPG) cylinders — Specification (*fourth revision*)
IS 8737 : 2017	Valve fittings for use with liquefied petroleum gas (LPG) cylinders for more than 5-litre water capacity — Specification (*second revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply:

3.1 Wear Check Gauge — Gauge for checking dimensional conformity of inspection ring gauges. This gauge is not used for gauging cylinder neck threads.

3.2 Inspection Gauge — Gauge used for the routine gauging of cylinder neck and valve stem thread but not for checking other gauges.

3.3 Two Part Gauges — Two separate inspection gauges, used in combination, where one is used to contact the large end of the taper cone and the other small end. These sets of gauges are plug or ring, plain or threaded.

4 DIMENSIONS OF THREADS ON VALVE STEMS AND IN CYLINDER NECKS

4.1 Principal Dimension

Thread reference planes and diameters shown in Fig. 1. Principal dimensions and limits on principal dimensions of valve stem threads and threads in cylinder neck are given in Table 1 and Table 2 respectively.

4.2 Thread Profile

The thread profiles of valve stems and cylinder necks shall be as shown in Fig. 2. The thread profile is a british standard whitworth (BSW) form with a 55° angle. The form and thread height measurements are perpendicular to the cone surface.

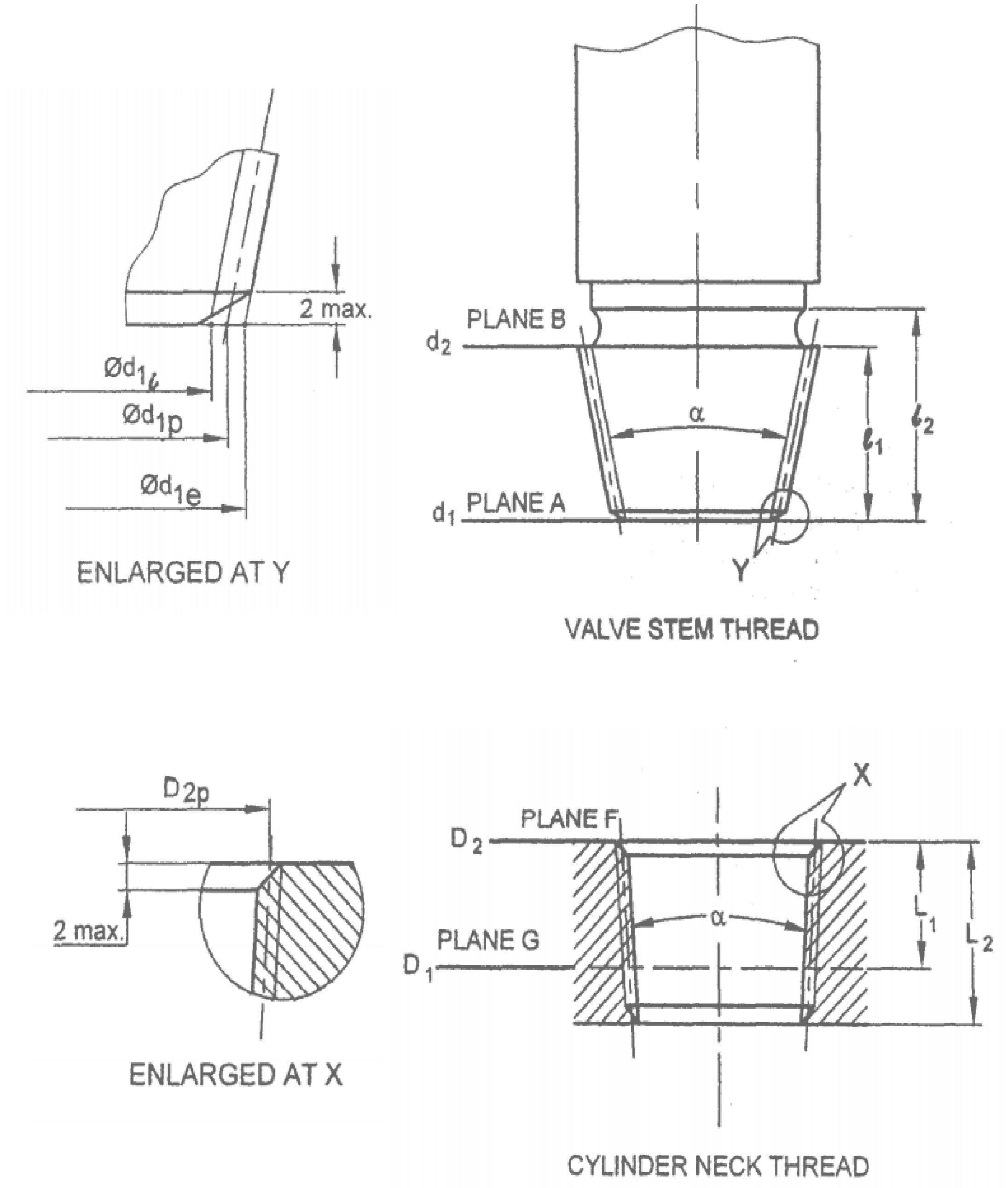
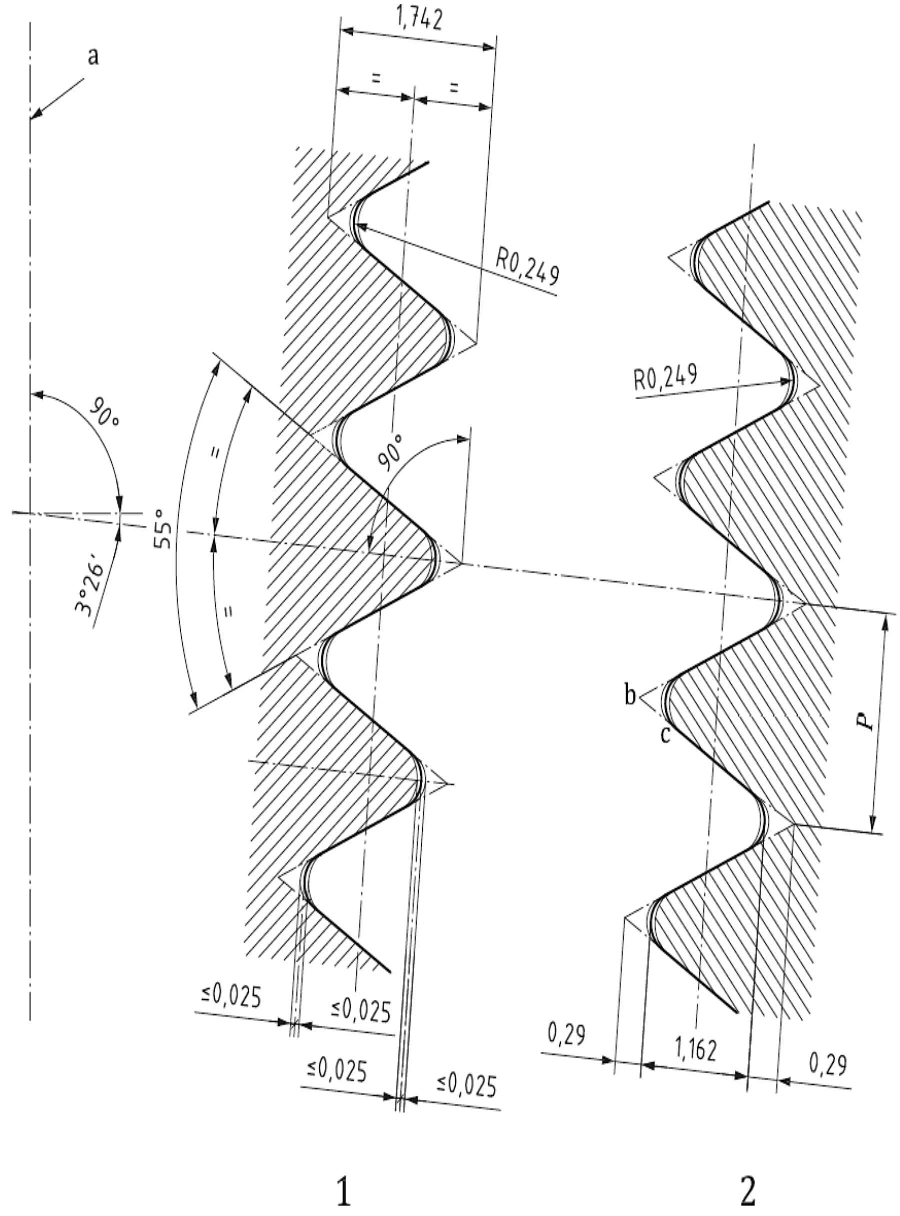


FIG. 1 DIMENSIONS OF VALVE STEM THREAD AND CYLINDER NECK THREAD



All dimension in millimetres

Key

P Pitch

1 Valve stem thread profile

2 Cylinder neck thread

a Thread axis

b Basic profile

c Design profile

FIG. 2 THREAD PROFILES OF VALVE STEMS AND CYLINDER NECKS

Table 1 Valve Stem Dimensions
(*Clause* 4.1)

All dimensions in millimetres

Sl No.	Valve Stem	Nominal Diameter and Type of thread	Major Dia at Small End d_{2e}	Major Dia at Small End d_{le}	Pitch Dia at Small End d_{1p}	Minor Dia at Small End d_{1i}	Pitch Dia at Larger End d_{2p}	Reference Length L_1	Full Thread Length l_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	Dimension	19.8 (17E)	19.8	17.28	16.118	14.956	18.638	21	≥ 21
		28.8 (25E)	28.8	25.68	24.518	23.356	27.638	26	≥ 26
ii)	Tolerance	-	+ 0.12	+ 0.12	+ 0.12	+ 0.12	+ 0.12	-	-
		-	0	0	0	0	0	-	-

Table 2 Cylinder Neck Thread Dimensions
(*Clause* 4.1)

All dimensions in millimetres

Sl No .	Cylinder Neck Thread	Nominal Diameter and type of thread	Major Dia at Small End D_{le}	Pitch Dia at Small End D_{1p}	Minor Dia at Small End D_{1i}	Pitch Dia at Larger End D_{2p}	Reference Length L_1	Full Thread Length L_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Dimension	19.8 (17E)	17.16	15.998	14.834	18.038	17	≥ 17
		28.8 (25E)	25.16	23.998	22.836	26.638	22	≥ 22
ii)	Tolerance	-	0	0	0	0	-	-
		-	-0.12	-0.12	-0.12	-0.12	-	-

5 GENERAL REQUIREMENTS

5.1 Material

All gauges shall be manufactured from material of suitable strength, stability and hardness.

Example: 85C6/15C4 of IS 1570 (Part 2) or suitable case hardening steel.

5.2 Taper

a) Taper :	3/25
b) Taper angle α:	6° 52'
c) Taper slope:	12 percent

5.3 Thread Rotation

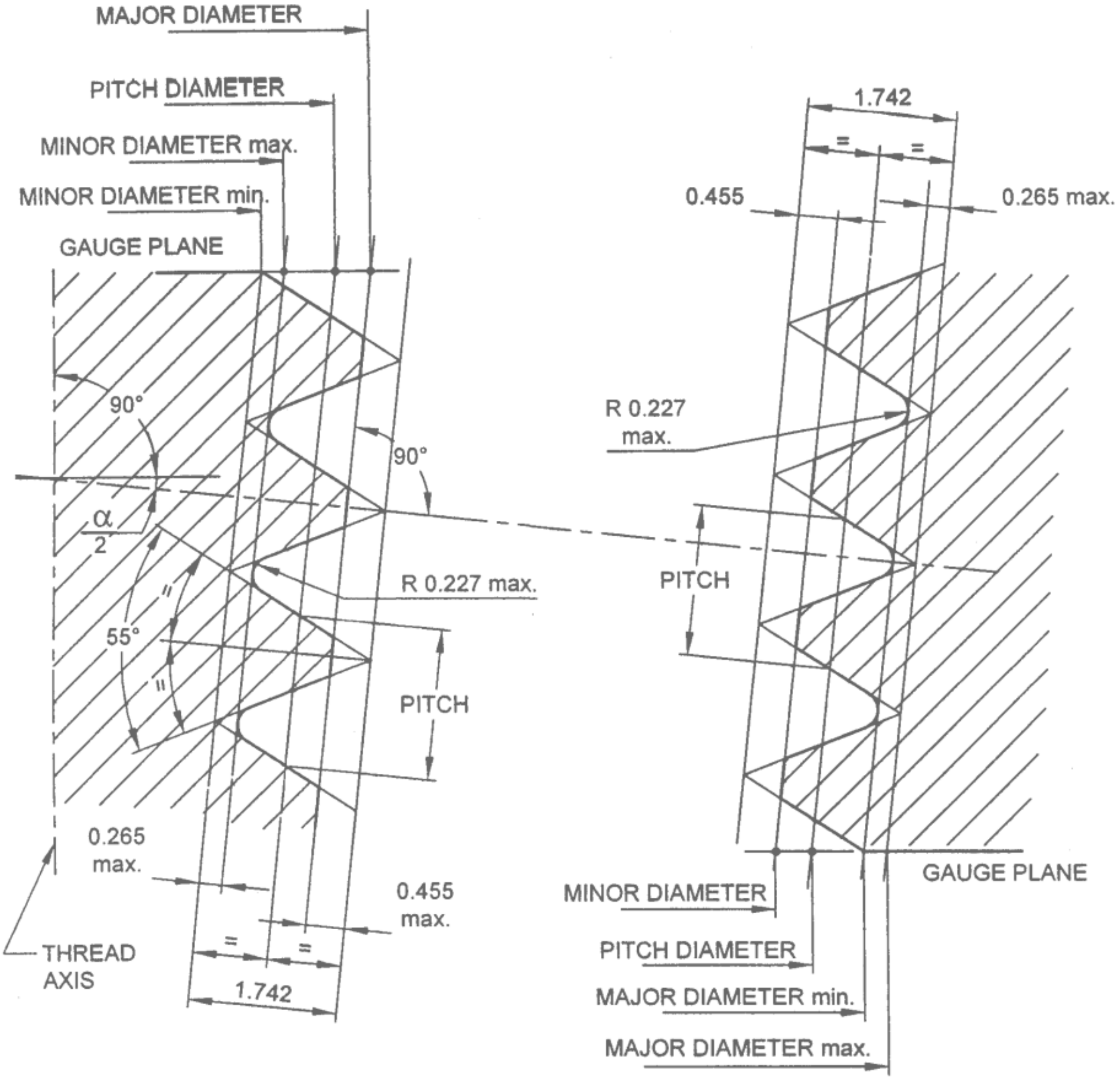
The thread shall be right handed, such that it moves away from an observer, when rotated clockwise.

5.4 Pitch

The pitch is 1.814 mm (derived from 25.4 mm/14 mm) (*see* Fig. 3).

5.5 Thread Profile of Thread Gauges

The thread profile is a British Standard Whitworth form, with a 55° angle. The form and thread height measurements are perpendicular to the cone surface (*see* Fig. 3).



PLUG GAUGE THREAD PROFILE

RING GAUGE THREAD PROFILE

FIG. 3 THREAD PROFILE OF THREAD GAUGES

5.6 Hardness

Minimum 750 HV (60 RC to 62 RC) or its equivalent.

5.7 Finish

Ground lapped and suitably stabilized.

6 GAUGE DIMENSION

The following dimensional requirements apply to gauges shown in Fig. 4 to Fig. 13.

6.1 All dimensions are in millimeters.

6.2 Tolerances for specified dimensions on all gauges are:

a) ± 0.01 mm on all lengths;

b) ± 0.01 mm on diameters of inspection gauges; and

c) – 0.02 mm to – 0.01 mm on diameters of wear check gauges.

6.3 For threaded gauges, pitch diameters only are specified. For minor and major diameters (*see* Fig. 3).

6.4 Unspecified dimension shall be chosen by the manufacturer of the gauges.

7 INSPECTION GAUGES

7.1 Gauge for Cylinder Neck Thread

Dimensions of plug gauges for cylinder neck thread are given in Table 3. Sample calculation for larger end diameter of 17E and 25E thread type are given in Annex A.

7.1.1 *Two-Part Plug Gauges* (*Small End Diameter*)

Consist of plain plug gauge for minor diameter at small end (I-3) and threaded plug gauge for pitch diameter at small end (I-4).

7.1.2 *Two-Part Plug Gauges* (*Large End Diameter*)

Consist of plain plug gauge for minor diameter at large end (I-5) and threaded plug gauge for pitch diameter at large end (I-6).

7.2 Gauges for Valve Stem Thread

Dimension of ring gauges for valve stem thread are given in Table 4. Sample calculation for larger end diameter of 17E and 25E thread type are given in Annex A.

7.2.1 *Two-Part Ring Gauges* (*Small End Diameter*)

Consist of plain ring gauge for major diameter at small end (I-9) and threaded ring gauge for pitch diameter at small end (I-10).

7.2.2 *Two-Part Ring Gauges* (*Large End Diameter*)

Consist of plain ring gauge for major diameter at large end (I-11) and threaded ring gauge for pitch diameter at large end (I-12).

7.3 Reference Wear Check Gauges (M)

Dimension for wear check gauges are given in Table 5. Sample calculation for larger end diameter of 17E and 25E thread type are given in Annex A.

Table 3 Dimension for Plug Gauges
(*Clause* 7.1)

Sl No.	**Thread Type**	**Neck Size**	**Plain Plug Gauge**		**Threaded Plug Gauges**						***L***
					Large end diameter			Small end diameter			
			d_4	d_5	Major diameter d_6	Pitch diameter d_7	Minor diameter d_8, *Max*	Major diameter d_9	Pitch diameter d_{10}	Minor diameter d_{11}, *Max*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Size l 17E	W 19.8 × 1/14 taper	16.876	14.836	18.87	18.038	16.826	16.83	15.998	14.786	17
ii)	Size 2 25E	W 28.8 × 1/14 taper	25.476	22.836	27.47	26.638	25.426	24.83	23.998	22.786	22

Table 4 Dimensions for Ring Gauges
(*Clause* 7.2)

Sl No.	**Thread Type**	**Valve Size**	**Plain Ring Gauge**		**Threaded Ring Gauges**						***L***
			D_4	D_5	Large End Diameter			Small End Diameter			
					Major diameter D_6	Pitch diameter D_7	Minor diameter D_8, *Min*	Major diameter D_9	Pitch diameter D_{10}	Minor diameter D_{11}	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Size l 17E	W19.8 × 1/14 taper	19.80	17.28	19.85	18.638	17.806	17.33	16.118	15.286	21
ii)	Size 2 25E	W28.8 × 1/14 taper	28.80	25.68	28.85	27.638	26.806	25.73	24.518	23.686	26

Table 5 Dimensions for Wear Check Plug Gauges
(*Clause* 7.3)

Sl No.	**Thread Type**	**Valve Size**	**Reference Plug Gauge 'M-1'**		**Threaded Check Gauges 'M-2'**						L_1
			d_{13}	d_{14}	Large End Diameter			Small End Diameter			
					Major diameter	Pitch diameter	Minor diameter d_{17}, *Max*	Major diameter d_{18}	Pitch diameter d_{19}	Minor diameter d_{20}, *Max*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Size l 17E	W19.8 × 1/14 taper	19.80	17.40	19.47	18.638	17.426	17.07	16.238	15.026	20
ii)	Size 2 25E	W28.8 × 1/14 taper	28.80	25.80	28.47	27.638	26.426	25.47	24.638	23.426	25

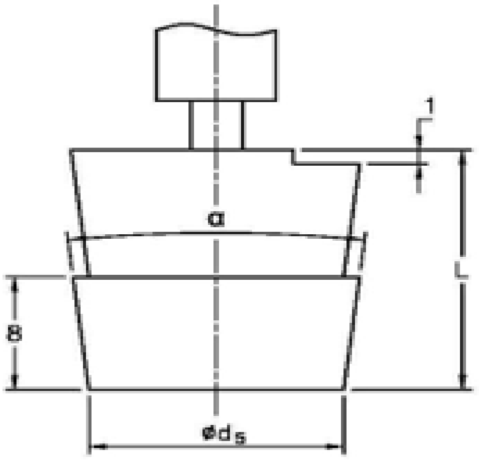


FIG. 4 Plain Plug Gauge for Minor Diameter at Small End (I-3)

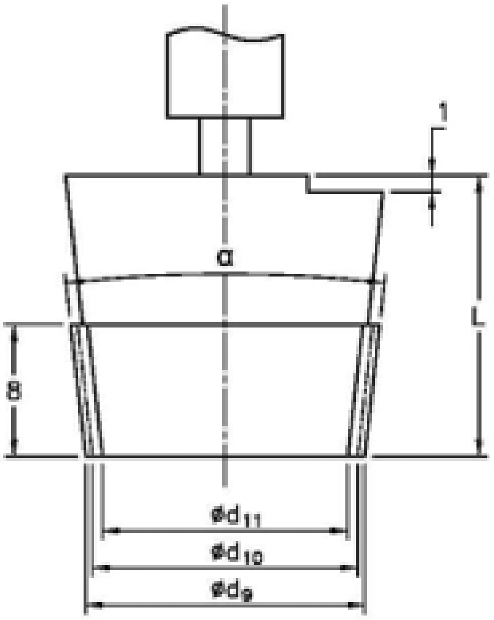


FIG. 5 Threaded Plug Gauge for Pitch Diameter at Small End (I-4)

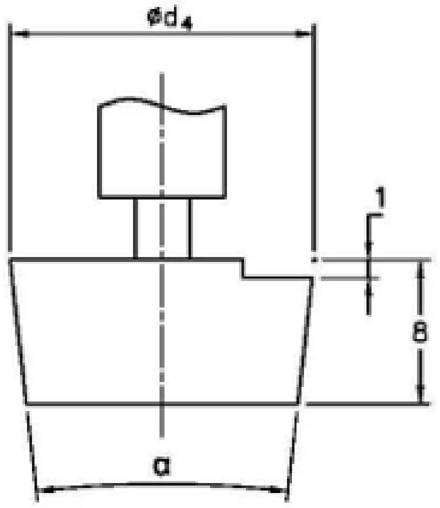


Fig. 6 Plain Plug Gauge for Minor Diameter at Large End (I-5)

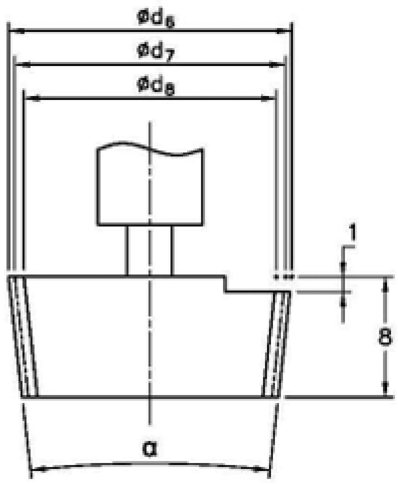


Fig. 5 Threaded Plug Gauge for Pitch Diameter at Large End (I-6)

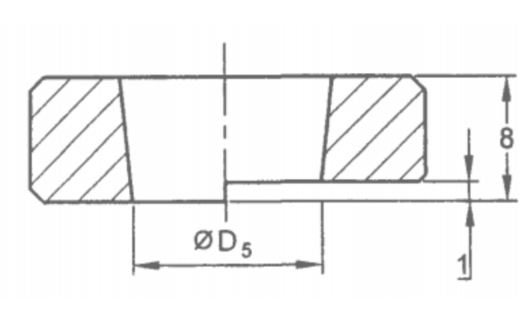


Fig. 8 Plain Ring Gauge For Major Diameter at Small End (I-9)

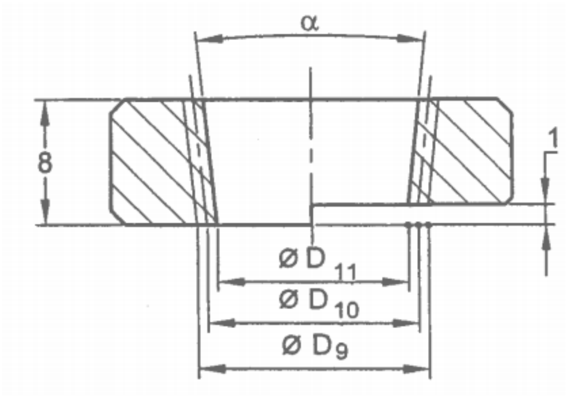


Fig. 9 Threaded Ring Gauge for Pitch Diameter at Small End (I-10)

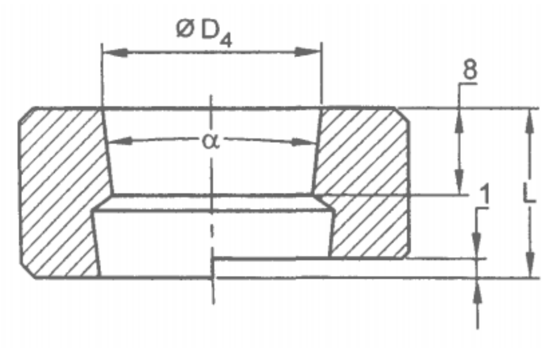


FIG. 10 PLAIN RING GAUGE FOR MAJOR DIAMETER AT LARGE END (I-11)

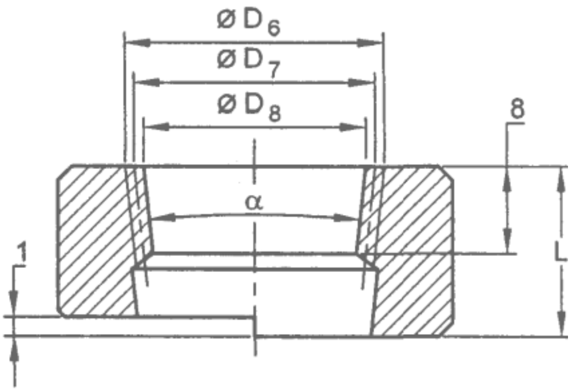


FIG. 11 THREADED RING GAUGE FOR PITCH DIAMETER AT LARGE END (I-12)

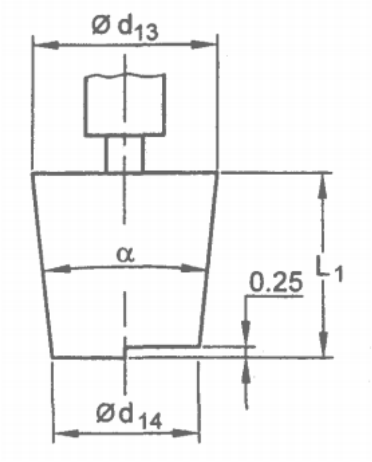


FIG. 12 PLAIN WEAR CHECK PLUG GAUGE (M-1)

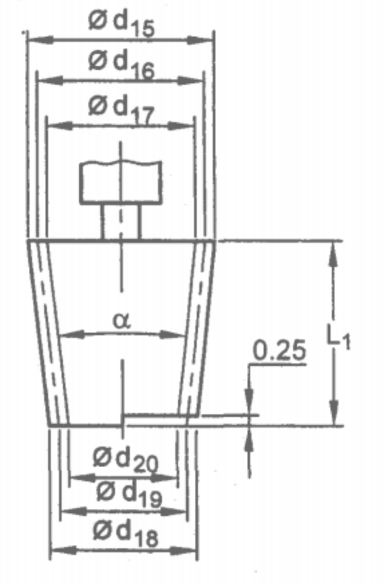


FIG. 13 THREADED WEAR CHECK PLUG GAUGE (M-2)

8 USE OF INSPECTION GAUGES

8.1 Plain Gauges

Plain gauges shall be lightly pressed into position or over the thread being gauged.

8.2 Threaded Gauges

Threaded gauges shall be screwed into or over the thread being gauged. Undue force shall not be used.

8.3 Accept or Reject Criteria, Using Plug Gauges

Thread acceptability to gauge is determined by the position of the plane at the mouth of the cylinder neck relative to the test surface of the gauge. The thread shall be considered acceptable to the gauge if this plane is flush with or falls between the test surfaces of the gauge when the gauge is fitted to the thread (*see* Fig. 14).

NOTE — For the acceptance of the cylinder neck thread, all the four plug gauges namely I-3, I-4, I-5 and I-6 shall have to be satisfied

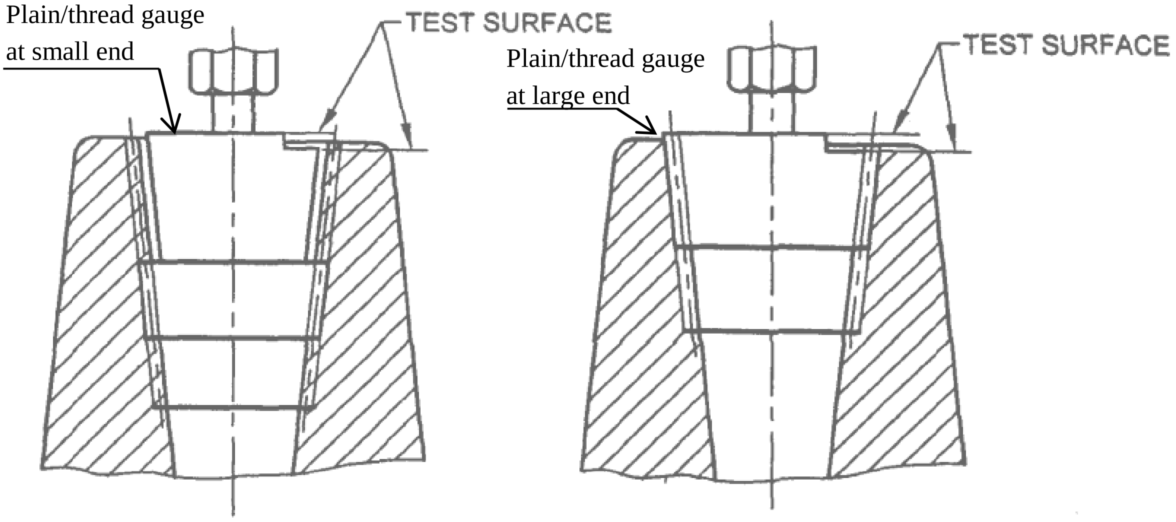

Plain/thread gauge at small end
TEST SURFACE
Plain/thread gauge at large end
TEST SURFACE

FIG. 14 USE OF TWO-PART PLUG GAUGE

8.4 Accept or Reject Criteria, Using Ring Gauges

Thread acceptability to gauge is determined by the position of the plane at the flat small end of the valve stem cone base relative to the test surface of the gauge. The thread shall be considered acceptable, to the gauge, if this plane is flush with or falls between the test surfaces of the gauge when the gauge is fitted to the thread (*see* Fig. 15).

NOTE — For the acceptance of the valve stem thread, all the four ring gauges namely I-9, I-10, I-11 and I-12 shall have to be satisfied.

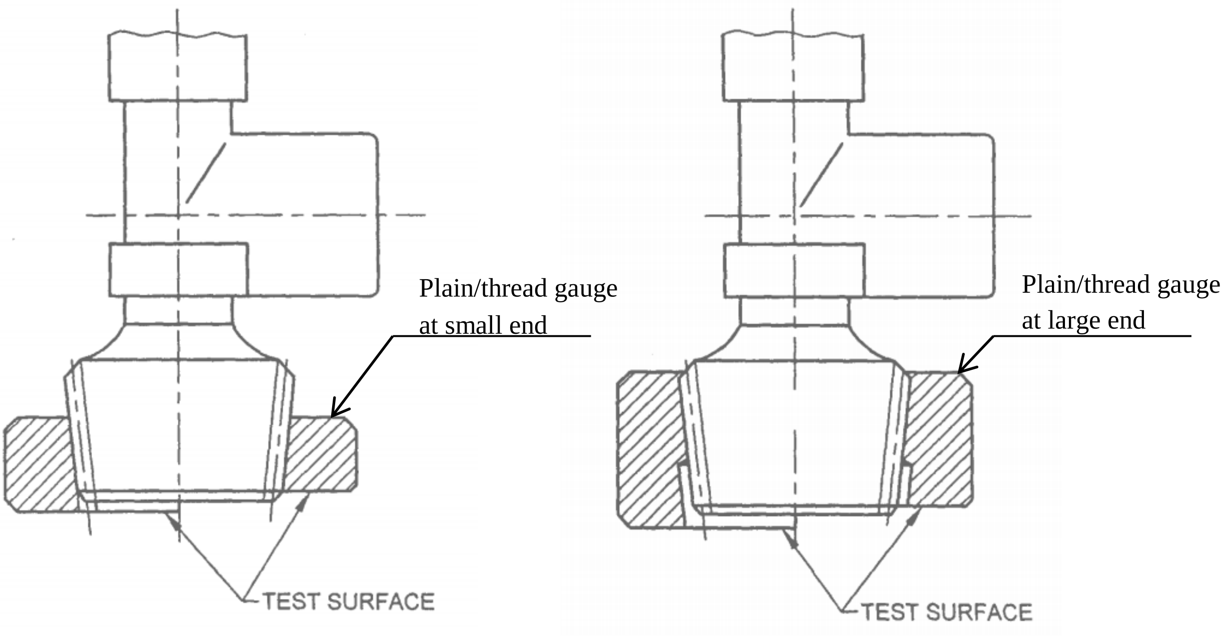

Plain/thread gauge at small end
TEST SURFACE
Plain/thread gauge at large end
TEST SURFACE

FIG. 15 USE OF TWO-PART RING GAUGE

9 VERIFICATION OF INSPECTION GAUGES

9.1 General

During use, inspection gauges will wear and can be damaged. The user shall ensure that the gauges are checked regularly to affirm that they remain within the specific dimensions. Frequency of checks required will depend upon usage and shall be the responsibility of the user.

9.2 Plug Gauges

Verification of inspection plug and wear check plug gauges shall be carried out directly, using optical or length measuring machine or other suitable equipment.

9.3 Ring Gauges

Verification of inspection ring gauges cannot be carried out directly, two wear check plug gauges as shown in Fig. 12 and Fig. 13 shall be used.

9.4 Use of Wear Check Gauges

The plain wear check plug gauge shall be placed into the plain inspection ring gauges and the thread wear check plug gauge shall be screwed into the threaded inspection ring gauge. The inner stepped surface of the inspection ring gauge test surface shall be flush with, or within either of the two test surfaces of the wear check gauge (*see* Fig. 16). Undue force shall not be used.

10 MARKING

10.1 The gauge shall be marked with the following:

a) Nominal size;
b) Gauge type and number of this standard;
c) Manufacturer's name or trade-mark; and
d) Serial number.

10.2 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

11 CORROSION PROTECTION AND PACKING

Gauges shall be protected against climatic conditions by application of any anti-corrosive coating. Packing should be suitable to prevent damage in transit.

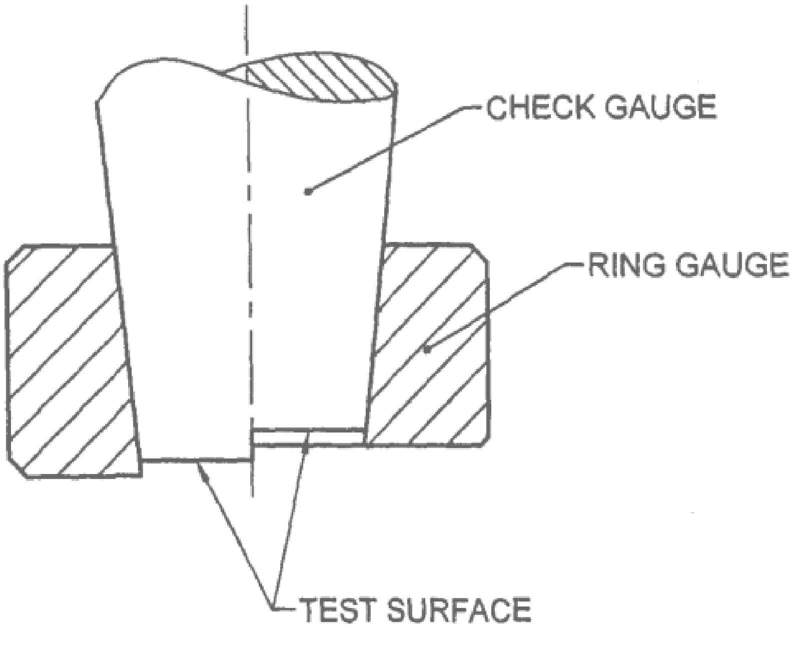


FIG. 16 USE OF WEAR CHECK GAUGE

ANNEX A

(*Clause* 7.1, 7.2 and 7.3)

EXAMPLE OF CALCULATION FOR THREAD GAUGE DIMENSION ON THE LARGE END DIAMETER

A-1 In the following example the mid allowable value for pitch diameter is used. In practice the true pitch diameter is determined and used for calculation. All dimensions are given in millimetres.

A-1.1 19.8 (17E) Thread Plug Gauge 'I-6' according to Fig. 7

A-1.1.2 Thread profile in accordance with Fig. 3.

A-1.1.3 Pitch diameter: 18.038; Tolerance: ± 0.01

A-1.1.4 Major diameter: 18.038 + 1.742 – (2 × 0.455) = 18.870; Tolerance: ± 0.01

A-1.1.5 Minor diameter, theoretical, crest (Minor diameter – Minimum dimension): 18.038 – 1.742 = 16.296

A-1.1.6 Minor diameter – Maximum dimension: 18.038 – 1.742 + (2 × 0.265) = 16.826

A-1.2 28.8 (25E) Thread Plug Gauge 'I-6' according to Fig. 7

A-1.2.1 Thread profile in accordance with Fig. 3.

A-1.2.2 Pitch diameter: 26.638; Tolerance: ± 0.01

A-1.2.3 Major diameter: 26.638 + 1.742 – (2 × 0.455) = 27.470; Tolerance: ± 0.01

A-1.2.4 Minor diameter, theoretical, crest (Minor diameter – Minimum dimension): 26.638 – 1.742 = 24.896

A-1.2.5 Minor diameter – Maximum dimension: 26.638 – 1.742 + (2 × 0.265) = 25.426

A-1.3 9.8 (17E) Thread Ring Gauge 'I-12' According to Fig. 11

A-1.3.1 Thread profile in accordance with Fig. 3.

A-1.3.2 Pitch diameter: 18.638; Tolerance: ± 0.01

A-1.3.3 Minor diameter: 18.638 - 1.742 + (2 × 0.455) = 17.806; Tolerance: ± 0.01

A-1.3.4 Major diameter, theoretical, crest (Major diameter – Maximum dimension): 18.638 + 1.742 = 20.380

A-1.3.5 Major diameter – Minimum dimension: 18.638 + 1.742 – (2 × 0.265) = 19.850

A-1.4 28.8 (25E) Thread Ring Gauge 'I-12' According to Fig. 11

A-1.4.1 Thread profile in accordance with Fig. 3.

A-1.4.2 Pitch diameter: 27.638; Tolerance: ± 0.01

A-1.4.3 Minor diameter: 27.638 – 1.742 + (2 × 0.455) = 26.806; Tolerance: ± 0.01

A-1.4.4 Major diameter, theoretical, crest (Major diameter - Maximum dimension): 27.638 + 1.742 = 29.380

A-1.4.5 Major diameter – Minimum dimension: 27.638 + 1.742 – (2 × 0.265) = 28.850

A-1.5 19.8 (17E) Thread Wear Check Gauge 'M-2' According to Fig. 13

A-1.5.1 Thread profile in accordance with Fig. 3.

A-1.5.2 Pitch diameter: 18.638; Tolerance: $^{-0.01}_{-0.02}$

A-1.5.3 Major diameter: 18.638 + 1.742 – (2 × 0.455) = 19.470; Tolerance: $^{-0.01}_{-0.02}$

A-1.5.4 Minor diameter, theoretical, crest (Minor diameter – Minimum dimension): 18.638 – 1.742 = 16.896

A-1.5.5 Minor diameter – Maximum dimension: 18.638 - 1.742 + (2 × 0.265) = 17.426

A-1.6 28.8 (25E) Thread Wear Check Gauge 'M-2' According to Fig. 13

A-1.6.1 Thread profile in accordance with Fig. 3.

A-1.6.2 Pitch diameter: 27.638; Tolerance: $^{-0.01}_{-0.02}$

A-1.6.3 Major diameter: 27.638 + 1.742 – (2 × 0.455) = 28.470; Tolerance: $^{-0.01}_{-0.02}$

A-1.6.4 Minor diameter, theoretical, crest (Minor diameter – Minimum dimension): 27.638 – 1.742 = 25.896

A-1.6.5 Minor diameter – Maximum dimension: 27.638 – 1.742 + (2 × 0.265) = 26.426

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Gas Cylinder Sectional Committee, MED 16

Organization	*Representative(s)*
Petroleum and Explosive Safety Organization, Nagpur	Shri P. Kumar **(*Chairperson*)** Shri K. S. Rao (*Alternate*)
All India Industrial Gases Manufacturers Association, New Delhi	Shri Saket Tiku Shri K. R. Sahasranam (*Alternate*)
Ashok Leyland Limited, Chennai	Shri Ved Prakash Gautam Shri Faustino V. (*Alternate* I) Shri Suchismita Chatterjee (*Alternate* II)
Bharat Petroleum Corporation Limited, Mumbai	Shri Rajwinder Singh Shri Hari Babu Banoth (*Alternate*)
Bhiwadi Cylinders Private Limited, New Delhi	Shri Manvinder Singh Shri Rajneesh Chopra (*Alternate* I) Shri Sunil K. Dey (*Alternate* II)
Everest Kanto Cylinder Limited, Mumbai	Shri Ayush Pawar Shri Ghanshyam Goyal (*Alternate* I) Shri A. S. V. S. Prasad (*Alternate* II)
Gujarat Gas Limited, Ahmedabad	Shri Ravi Ravipalli
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